



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,360	10/31/2003	Eric S. Olson	TCOM0012	5403
39258	7590	12/10/2008		
TENSORCOMM, INC. c/o iSherpa Capital 6400 S. Fiddler's Green Circle, Suite 650 Greenwood Village, CO 80111			EXAMINER MALEK, LEILA	
			ART UNIT	PAPER NUMBER
			2611	
			MAIL DATE	DELIVERY MODE
			12/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/699,360	Applicant(s) OLSON ET AL.	
	Examiner LEILA MALEK	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11- 20, 23-28, and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11- 20, 23-28, and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in response to the amendments received on 09/08/2008.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 16, and 24 recite the limitation "the matrix" in "S in the matrix". There is insufficient antecedent basis for this limitation in the claim. Applicants failed to define the matrix in the claim.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 16-20 and 23 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 16-20 and 23 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. The instant claims do not positively tie the subject matter to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 11-14, 16- 20, 23-28, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madhow et al. (hereafter, referred as Madhow) (US 6,175,587), and Affes et al. (hereafter, referred as Affes) (US 6,975,666), further in view of Kober et al. (hereafter, referred as Kober) (US 2003/0218568).

As to claim 1, Madhow discloses a demodulator unit (see Fig. 2 (220)) configured for demodulating one or more of a plurality of signals (see Fig. 2); and a processing engine 400 (see Figs. 3 and 4) communicatively coupled to the demodulator unit (Fig. 2 (220)) and configured for generating interference vectors (column 6 (specially line 58), column 7, lines 1- 5, 16-37, and column 8, lines 10-13), wherein each of the interference vectors comprises a component of an interfering signal (column 9, lines 31-67 and column 10, lines 1-6) and wherein the vectors are used to selectively substantially reduce energy from one or more of the signals (column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow further discloses that the processing engine is further configured to generate, a cancellation operator (i.e. projection operator) used to substantially reduce the energy of the signals selected for energy reduction (see the abstract, column 5, lines 33-48, column 7, lines 6-33, column 8, lines 40-60, and column 10, lines 3-12). Madhow

Art Unit: 2611

discloses all the subject matters claimed in claim 1, except that the processor generates a vector which is a linear combination of one or more interference vectors. Madhow, also does not expressly disclose that the cancellation operator comprises a projection operator having the following form $P_S^\perp = I - S(S^T S)^{-1} S^T$. As to the first limitation missing from Madhow, Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18); and a processing engine (see column 22, lines 54-56 and Fig. 11, block 42B) communicatively coupled to the demodulator unit and configured for generating a vector (\underline{I}_n) that is a linear combination of one or more interference vectors (see column 20, lines 44-65), wherein each of the interference vectors comprises a component of an interfering signal and wherein the vector is used to cancel the interference from the strongest signal (see column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference. As to the second limitation missing from Madhow, Kober, in the same field of endeavor, discloses a receiver for mitigating or cancelling signal interference between signals detected at the receiver (see the abstract). Kober discloses that with receiver properly equipped to perform projection operation, interfering signals and multipath and can be diminished (see the abstract). Kober teaches that the interference mitigating technique uses a cancellation operator comprises a projection operator having the following form $P_S^\perp = I - S(S^T S)^{-1} S^T$ (see paragraphs 0099-0104), wherein the I

Art Unit: 2611

is an identity matrix, S is the interference matrix, and S^T is a transpose of the interference matrix. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow and Affes as suggested by Kober to more accurately determine the effect of interference on a signal and mitigate the interference (see paragraph 0100).

As to claim 2, Madhow discloses a searcher finger 114 configured for selecting signals for demodulation from the plurality of signals and for determining one or more codes from selected signals (see column 4, lines 44-46 and Fig. 2).

As to claim 3, Madhow discloses that the demodulator unit comprises a plurality of demodulator fingers configured for demodulating the selected signals (see Figs. 1 and 2).

As to claim 4, Madhow further discloses that the determined codes comprise code offsets in time from one another (see column 4, lines 6-8 and column 8, lines 55-57).

As to claims 5, Affes further discloses that the vector comprises a composite interference vector (see column 20, lines 53-57) constructed using code information and amplitude information (see column 4, lines 38-52 and column 20, lines 21-36). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to suppress the interference more effectively.

As to claim 6, Madhow further discloses that the demodulator unit is assigned to at least one of a multipath signal from a base station in soft handoff with the mobile unit

Art Unit: 2611

or to a strong multipath signal from a base station not in soft handoff (see column 8, lines 14-19).

As to claim 7, Madhow further discloses that a radio frequency front end configured for receiving the signals (column 4, lines 26-31).

As to claim 8, Madhow further shows (see Fig. 4 (402,404)) that the processing engine comprises a channel selector configured for selecting components of the determined codes from signals selected for energy reduction (column 7, lines 29-49, column 8, lines 40-60).

As to claim 11, Kober further discloses an application unit is configured for applying the projection operator to a desired code (H) to selectively substantially reduce on or more of the plurality of signals, wherein the projection operator is applied to the desired code to the following form $P_S^\perp H = (I - S(S^T S)^{-1} S^T)H$ (see paragraph 0105).

As to claim 12, Madhow further discloses that the determined codes are spreading codes (see column 3, lines 66).

As to claim 13, Affes discloses that the spreading coded used is a short code (see column 12, lines 7-13). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to make the process of interference reduction more convenient (see column 12, lines 12-13).

As to claim 14, Madhow discloses that the processing engine further correlates a despread received signal against a plurality of Walsh codes covering code is selected from a group consisting of a Walsh (see column 5, lines 34-36).

As to claims 16, 23, 24, and 31, Madhow discloses a demodulator unit (see Fig. 2 (220)) configured for demodulating one or more of a plurality of signals (see Fig. 2); constructing at least one interference vector (see column 6) from the at least one demodulated signal of a plurality of signals; wherein the at least one interference vector comprises components of an interfering signal (column 9, lines 31-67, column 10, lines 1-6); wherein the vectors are used to selectively substantially reduce energy from one or more of the signals (column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow further discloses that the processing engine is further configured to generate, a cancellation operator (i.e. projection operator) used to substantially reduce the energy of the signals selected for energy reduction (see the abstract, column 5, lines 33-48, column 7, lines 6-33, column 8, lines 40-60, and column 10, lines 3-12). Madhow discloses all the subject matters claimed in claims 16, 23, 24, and 31, except for generating a vector that is a linear combination of one or more interference vectors. Madhow, also does not expressly disclose generating a cancellation operator by using the interference matrix (i.e. the vector) for application to a desired code, wherein generating the cancellation operator comprises projection operator having the following form $P_S^\perp = I - S(S^T S)^{-1} S^T$. As to the first limitation, Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18). Affes further discloses generating a vector (I_n) that is a linear combination of one or more interference vectors (see column 20, lines 44-65), wherein each of the interference

Art Unit: 2611

vectors comprises a component of an interfering signal. Affes further discloses that the vector is used to cancel the interference from the strongest signal (see column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference. As to the second limitation missing from Madhow, Kober, in the same field of endeavor, discloses a receiver for mitigating or cancelling signal interference between signals detected at the receiver (see the abstract). Kober discloses that with receiver properly equipped to perform projection operation, interfering signals and multipath can be diminished (see the abstract). Kober teaches that the interference mitigating technique uses a cancellation operator comprises a projection operator having the following form $P_S^\perp = I - S(S^T S)^{-1} S^T$ (see paragraphs 0099-0104), wherein the I is an identity matrix, S is the interference matrix, and S^T is a transpose of the interference matrix. Kober further discloses applying the projection operator to a desired code (H) to selectively substantially reduce one or more of the plurality of signals, wherein the projection operator is applied to the desired code to the following form $P_S^\perp H = (I - S(S^T S)^{-1} S^T)H$ (see paragraph 0105). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow and Affes as suggested by Kober to more accurately determine the effect of interference on a signal and mitigate the interference (see paragraph 0100).

As to claims 17 and 25, Madhow further discloses searching for one or more signals from the plurality of signals for assigning to at least one demodulating unit (see Figs. 1 and 2).

As to claims 18 and 26, Madhow discloses determining one or more codes for signals assigned to the demodulating unit selected from the plurality of signals (see Fig. 2).

As to claims 19 and 27, Affes discloses summing a plurality of the interference vectors to form a composite interference vector (see column 20). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21).

As to claims 20 and 28, Affes further discloses that the vector comprises a composite interference vector (see column 20, lines 53-55) constructed using code information and amplitude information (see column 4, lines 38-44 and column 25, lines 37-41). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to suppress the interference more effectively.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Madhow, Affes, and Kober, further in view of Applicants' background of invention.

As to claim 15, Madhow, Affes, and Kober, disclose all the subject matters claimed in claim 1, except that the signals are selected from a group consisting of cdma2000 and cdmaOne signals. Applicants in the background of invention further

Art Unit: 2611

disclose that the signals are selected from a group consisting of cdma2000 signals and cdmaOne signals (see page 2). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow, Affes, and Kober, as suggested by Applicant's background of invention to take advantage of higher data rates in the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2611

Leila Malek
Examiner
Art Unit 2611

/L.M./

/Leila Malek/
Examiner, Art Unit 2611

/Mohammad H Ghayour/
Supervisory Patent Examiner, Art Unit 2611